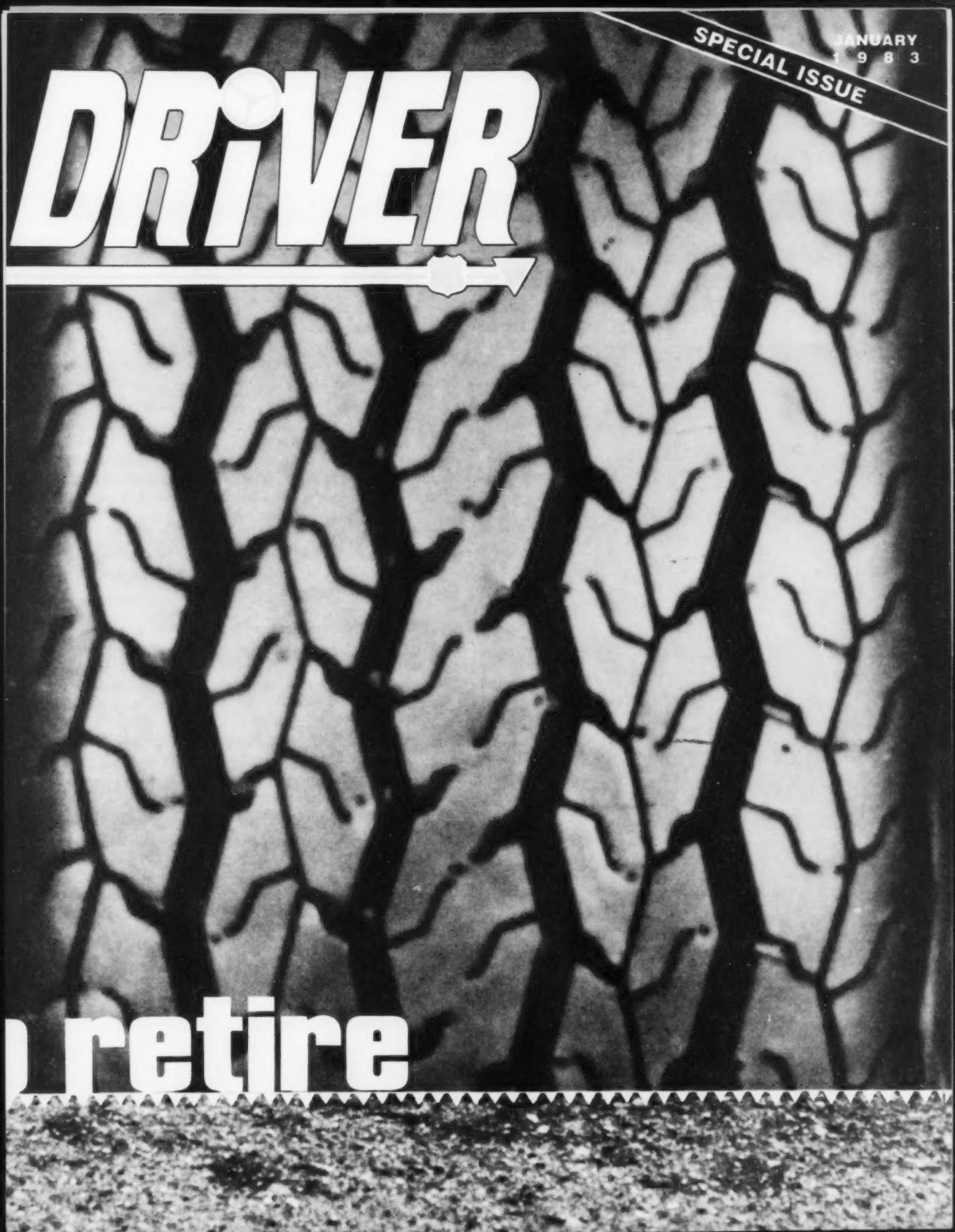
SPECIAL ISSUE
JANUARY
1983
DRIVER
retire

Introduction

"Boy, are we ever tired of being treated this way!"

Right Rear: What a beating we take! We roll over all kinds of rough and pitted surfaces, we get smashed into ruts and potholes, we are scrubbed against curbsides, we have vital millimeters burned off our tread with rapid starts and panic stops . . .

Left Front: Not only that, we are mostly ignored by the people who drive the cars that sit on us. The people let us pick up rocks and nails and shards of glass that will put holes in us. They drive on us until we are so worn down we can't keep the car going straight on a wet road. They just don't care.

Left Rear: How about some air, people? Do you ever think about giving us some air? We work a lot better when we're full of air. We roll smoother and we don't heat up so much, and we last longer.

Right Front: That's all we ask for, just a decent chance at life. *Tread* life. Do they ever think of rotating us so we get more even wear? No. Do they keep us clean and use a silicon spray on us so we don't dry and crack? No. Do they keep the car aligned and the wheels balanced so we have a chance to wear longer? No.

Right Rear: And that's the dumb part. When they don't take care of us, we can't take care of them. We are the only contact they have with the road. We are the "front line of safety" because we provide the traction for starts, stops and turns. Take an average car and put a superior set of us on it, and you've got a safe automobile. And even a goodhandling car won't show you much if you put on a mis-matched set of us.

Left Front: Pay attention to us, you guys out there! We finally talked those bozos at DRIVER into writing some information about us. Read it and you'll know better how to take care of us.

Left Rear: Yeah! Be good to us and we'll be good to you. Be rotten to us and you'll be real sorry.

Spare: Keep your air in, Lefty. They're about to *learn* how to be good to us. Take it away, DRIVER!

Spare: We want to thank the Tire Industry Safety Council and its members, Armstrong, Cooper, Dayton, Denman, Dunlop, Firestone, General, B.F. Goodrich, Goodyear, Kelly-Springfield, Lee, McCreary, Mohawk and Uniroyal, for their help in putting together this special issue.

Range Rover
ISSUE

Driving Habits

Your car can't provide you transportation without tires. It can't move, stop, turn or even ride comfortably without them. And if the tires aren't in good condition, properly inflated and maintaining good contact with the road surface because of balance and wheel alignment, you are just an accident looking for a place to happen.

Ask most people the elements of good tire care and you'll get such answers as: "proper inflation," "regular inspection," and "correct alignment and balance." Somebody might even say, "replace them before they're bald." But few would even think of mentioning "good driving habits."

The way you drive has a lot to do with tire care and, of course, your safety. Probably the best driving habits you can develop to care for your tires are:

- **Observe the speed limit**
- **Avoid fast starts**
- **Don't slam on the brakes**
- **Make turns smoothly and at reasonable speeds**
- **Avoid potholes and objects in the road**
- **Don't run over curbs**

Perhaps one of the worst driving habits — and the most dangerous — is spinning tires on slippery surfaces such as ice, snow, mud or sand. The centrifugal forces created by a rapidly spinning tire can literally tear the tire apart. With today's recommended pressures the energy released by such an explosion is sufficient to cause serious injury or death.

So, if your car does become stuck, rock the car gently back and forth by alternating between forward and re-

Tire-burning fast starts leave 1,000 miles worth of tread behind.

DRIVER

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JAN

VOLUME 16 NUMBER 8

CONTENTS

SPECIAL TIRE ISSUE

Driving Habits 1

Inspection 4

Is It Time To Replace? 6

Selection Don't Panic 7

Mixing, Matching and Other Magic 9

The Sidewall Story 11

UTQG 12

Rotation 13

Gauging Inflation 14

Cold Weather Driving 18

Tires and RVs 19

PRO Lessons 21

Feature

Seatbelts Save 27

Departments

The Backyard Mechanic 22

Backfire 28

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Impacting road edges, potholes and curbs damages tires. And because the damage usually is done to the inside of the tire, it may not fail until miles after the impact.

verse, avoiding wheel spin as much as possible. Never race the engine in such situations because the free spinning wheel will be traveling twice the speedometer reading. And never allow anyone to stand near or directly behind the spinning tires.

If you can't free the car by gentle rocking, get a push or a tow.

But no matter how carefully you drive, there is always a chance that you may get a puncture and have a flat tire. In this case, you have to toss saving the tire to the wind and look out for your personal safety first. Drive slowly to the closest *safe* area out of the traffic. While this may ruin the flat tire, the cost is repaid in your own safety.

For details on dealing with a flat tire, see the August 1981 DRIVER. Basically, follow the instructions in your car owner's manual on jacking up the car, taking off the wheel and putting on the spare. Then drive to a place where the flat can be inspected for possible repair or replacement.

Many newer cars come equipped with a temporary spare which is different from the regular tires and rims on the vehicle. Be sure to follow the special instructions accompanying such temporary spare tires. Some may require higher inflation pressure or use of special inflation canisters. And some cannot be driven faster than 50 mph or farther than 50 miles.

You should never try to take a tire off the rim. This is a job for trained professionals who are aware of the safety hazards involved. Besides, improper mounting and overinflation may damage the tire or rim and can result in an explosion.

continued

Temporary spare tires require special attention to instructions.

continued

Inspection

(below)
Inspect your tires carefully at least once a month.

At least once a month you should inspect your tires closely for signs of uneven tread wear. Such excessive wear patterns may be caused by improper inflation pressures, misalignment, improper balance or suspension neglect. If not corrected, further tire damage will occur. If you catch it in time, the cause may often be corrected by a service facility and your tires will serve you safely much longer.

While you're inspecting your tires remove small pebbles, bits of glass and other foreign objects which may have become wedged in the tread or they could work their way deeper into the tire and cause loss of air.

Remember that tires on the front of front-wheel-drive vehicles will wear more rapidly than those on the rear. This is because they not only provide the usual steering and stopping functions but also handle the driving and acceleration loads.

Tires that are worn in the center of the tread are over-inflated. Those that are worn on both outer edges are under-inflated. Now, if the inflation pressure has been kept reasonably correct and the tread still shows signs of wear on both shoulders, you've been hot dogging around corners — haven't you?

Mechanical problems also contribute to rapid tread wear. For example, too much positive camber causes rapid wear on the outside of the tread, while too little camber rapidly wears the inside.

The biggest thief of tire tread is incorrect toe-in. A visible or feelable trailing flap of rubber on each tread groove is a sure sign of incorrect toe-in. The pattern is called a feathered edge or sawtooth. If you feel sharp edges as you run your hand over the tread toward the center, there is not enough toe-in. However, if you feel the same thing while moving your hand out, there is too much toe-in.

Cupped, dished or scalloped tread wear is produced by a combination of mechanical problems such as loose ball joints, weak shock absorbers, loose tie rod ends, idler arm bushings, etc. These must be corrected as soon as found because the forces of cornering, acceleration and deceleration can encourage further wear.

Flat spots are signs of imbalance, mechanic or runout problems. Once a tire has developed a flat spot, no balancing procedure will correct the problem, although there are tire truing procedures that can make the tire reasonably round again so that it will accept and hold a balance.

Also examine your tread for cuts, cracks or snags deep enough to expose tire ply cords. If there are any, the tire should be replaced.

If a tire has suffered a severe impact, it should be demounted and inspected for interior damage by a trained tire professional. Although there may be little or no visible exterior indication, the body of the tire may be bruised. This inside bruise

will be aggravated by the constant flexing of the tire until it fails.

Be sure to check for punctures by nails or other foreign objects, too. And give the rim a good once over for bends, cracks and other damage. It doesn't hurt to give the bolts, nuts and lugs a check also.

And there's always the tire valves. They should be in good condition and be equipped with caps to keep out dirt and moisture.

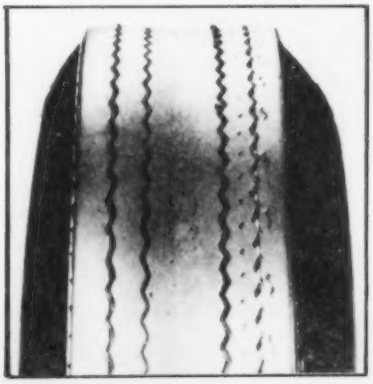
And finally, there is an everyday inspection. If your tires squeal, they're sliding or slipping. Now this can be caused by underinflation, speed, road surface, topography, temperature or driving too fast on curves and around corners. But the squealing is a warning that everything is not right.

Take care of your tires and they'll take care of you.

continued

(right)
Puncture-resistant tires can run for 10,000 miles or more with 3/16-inch diameter holes in the tread, but if you find signs of a puncture you should have the tire repaired at once.

(below, left to right)
Uneven tread wear can be caused by incorrect inflation pressure, misalignment, improper balance or suspension neglect and should be corrected to prevent further damage.



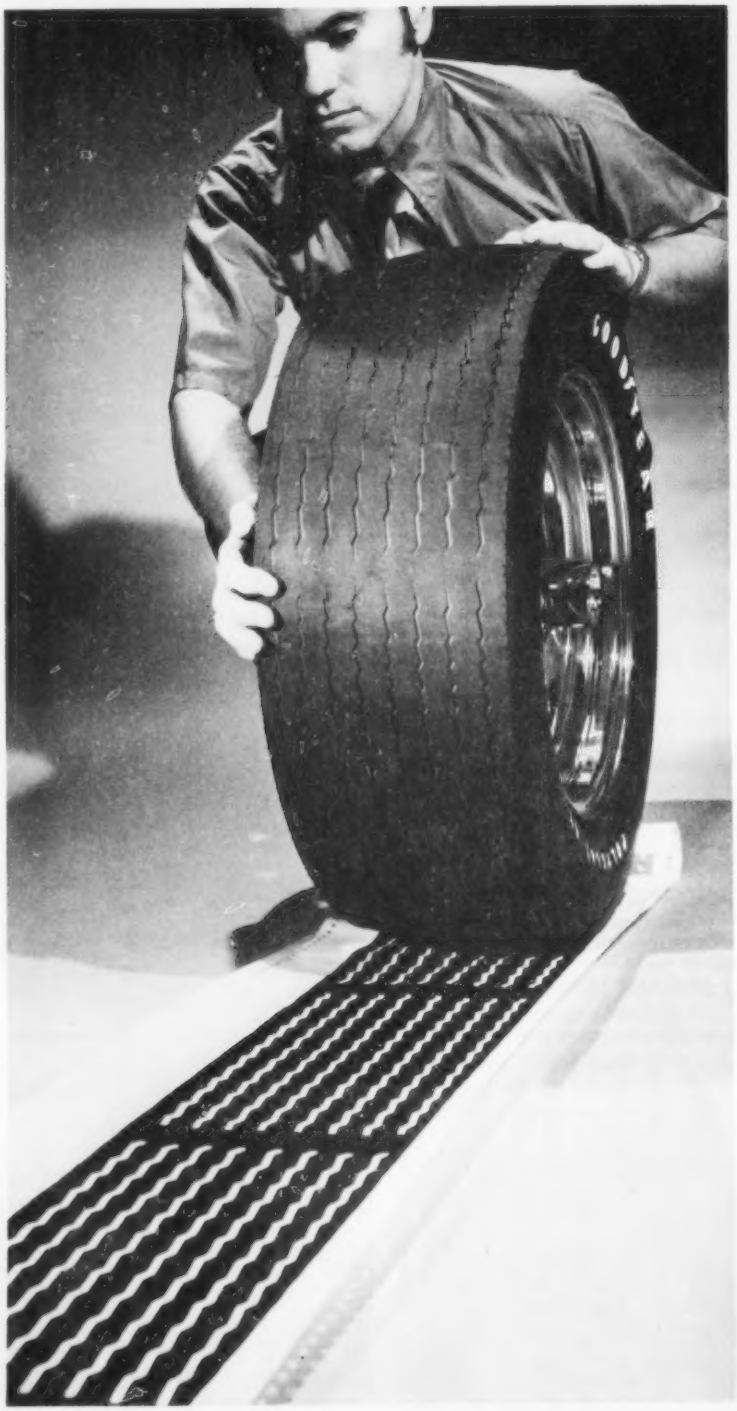
continued ■

Is It Time To Replace?

It's time to replace your tires when the remaining tread is down to 1/16th of an inch. That's the danger line. And you can easily tell when the danger line has been reached because of built-in wear indicators. These "wear bars" will begin to show as narrow bands of smooth rubber across the tread at intervals around the tire.

A majority of states have tread depth laws or other regulations against using tires with less than 1/16th-inch of tread.

It's just good common sense. Bald tires are more likely to have flats than new tires. The risk of skidding is much greater on wet roads than on dry ones, and bald tires increase that probability. Bald tires can lead to accidents and should be replaced. Don't take a chance.



"Wear Bars" which look like narrow strips of smooth rubber across the tread will appear on the tire when the danger line is reached.

Selection Don't Panic

When it comes time to buy new tires you have to make endless choices; but don't panic.

You used to be able to drive into your local gas station, ask for a set of 6.45-14s and that was all there was to it. But in the last few years there have been many new concepts introduced in the tire field — new tire constructions, profiles and materials. But don't panic.

Don't panic — this isn't exactly an invasion from outer space. These are "green" steel-belted radial passenger car tires awaiting to be cured in molds at Firestone's production facility in Wilson, N.C.

Today's tires have three different types of construction: diagonal (bias), belted bias and radial. And there are many different designations: P, 80, 78, 75, 70, 65, 60, 55, 50 . . . Cord materials include polyester, fiberglass, aramid, steel, rayon and nylon.

And there are more brands than . . . than just about anything you can name. There are about three dozen manufacturers worldwide making tires to be sold under more than 150 brand names in the United States alone. However, don't panic.

Of course when it comes time to buy tires the big question is: "What tires does my car need?" For the answer look at the tire placard on the car. It tells you what size the tires were on the car as original equipment. Tires should always be replaced with the same size designation, or approved options, as recommended by the vehicle manufacturer. And that's what is on the placard.

For the best all-around performance, tubeless tires of the same construction and size designation should always be used at all four wheel positions. But whatever you do, never choose a smaller size tire than the size on the tire placard.

Under some circumstances it is possible to use tires of different sizes and construction on a vehicle provided the tires are not on the same axle. But always check with your tire dealer before doing so, and check out the mixing story elsewhere in this issue.

If you are buying only two new tires instead of four, put the two new tires on the rear wheels for better handling. A single new tire should be paired on the rear axle with the tire having the most tread depth of the other three.

At some time you may want to change the tread design or type of tires on your car. Usually you can safely switch to alternative type tires, but first consult your tire or auto dealer. Dealers have factory manuals and charts which list approved options, replacement sizes, changes in pressure if required and acceptable tire combinations.

However, there is one iron-clad tire mixing rule: When two radial tires are used with two belted bias or bias tires, the radials must always be placed on the rear wheels. Otherwise, the car may be difficult to handle in an emergency maneuver, possibly causing a serious accident.

As always, front and rear tires and wheels should be balanced by an expert. Poor ride in the form of a vibration or thump may indicate a need for re-balancing.

And when replacing tires, valves should also be replaced.

"When you buy a tire, make sure

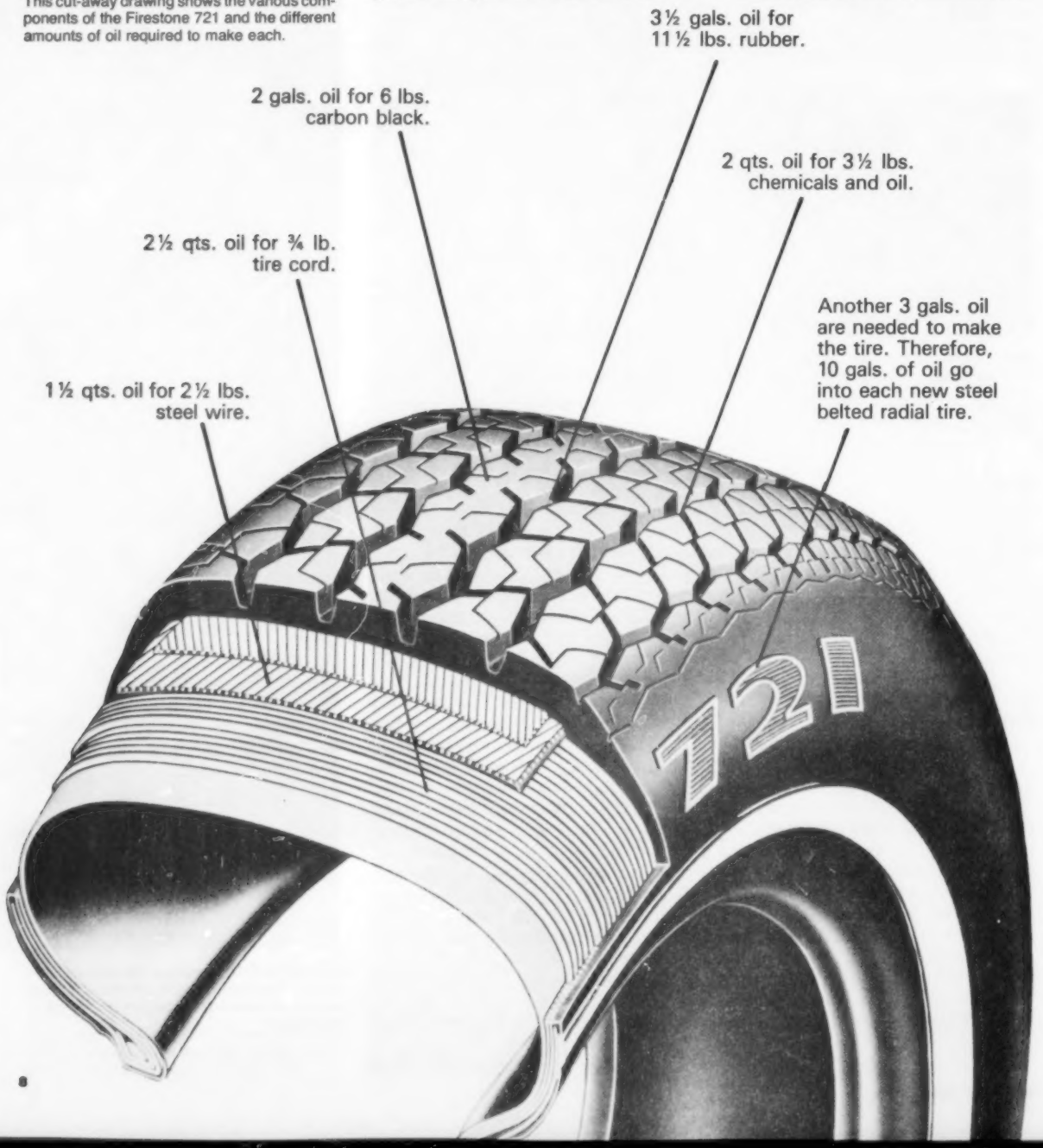
continued

Changing to an all-season tire such as Firestone's Steel Belted Radial 721 Metrix is easy as long as the new tires comply with your car's tire placard.

that your name and address is sent back to the tire manufacturer," said Donald G. Brotzman, Tire Industry Safety Council chairman. "Then the manufacturer can notify you directly in the event of a recall."

A recent change in federal law requires independent tire dealers to provide each purchaser with a form containing the identification number of the tire. The customer then must complete the form with his or her name and address, and mail it back to the manufacturer to be sure the tire is registered.

Tire outlets owned by manufactur-

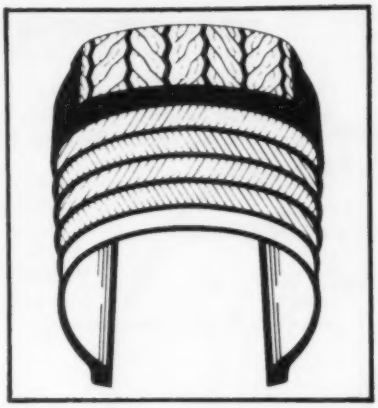

3½ gals. oil for 11½ lbs. rubber.
2 gals. oil for 6 lbs. carbon black.
2 qts. oil for 3½ lbs. chemicals and oil.
2½ qts. oil for ¾ lb. tire cord.
Another 3 gals. oil are needed to make the tire. Therefore, 10 gals. of oil go into each new steel belted radial tire.
1½ qts. oil for 2½ lbs. steel wire.
721

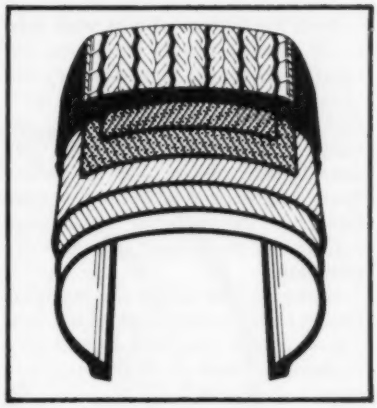
Radial tires not only improve your car's fuel economy but they require 20 percent less oil to make than what was required five years ago. This cut-away drawing shows the various components of the Firestone 721 and the different amounts of oil required to make each.

ers and brand name marketers must continue to fill out the registration forms themselves for the customer and return the forms to the manufacturer or to a collection point designated by the manufacturer.

Finally, remember DRIVER's cardinal rule of tire buying: DON'T PANIC.

Some tires for street cars today closely resemble racing tires and provide wet weather traction almost equal to what they generate in the dry.





CONSTRUCTION

In diagonal ply, also known as bias ply tires (left), the cords run at an angle of approximately 35 degrees to the center line of the tread, giving strength to both the sidewall and tread. They may have two, four or more body plies. Alternate plies extend in opposite directions.

In radial tires (right), the cords run almost perpendicular across the tire from bead to bead. Radial tires have belt plies, which run circumferentially around the tire, under the tread. This construction gives rigidity to the tread area and maximum flexibility to the sidewall. The belts restrict tread movement during contact with the road, thus improving tread life.

Belted bias tires are a combination of diagonal and radial constructions. The cords run at an angle similar to that of bias tires, plus there are two or more belts like those on radials under the tread. This construction gives extra stability to the tread.

Mixing, Matching and other magic

Mixing tires of different constructions, profiles, dimensions and ride characteristics on the same car can be as dangerous as angering a sorcerer — you could be turned into a hoptoad or disappear from the face of the earth.

As we've said elsewhere in this special tire issue, always check the vehicle manufacturer's recommendations before replacing tires with a different size and/or construction. Tires of different basic construction — diagonal (bias), belted bias and radial — series (profiles), dimensions and ride characteristics can seriously affect vehicle handling and your safety.

And it's equally important that you follow recommended inflation pressures for proper vehicle and tire performance.

As a general rule, don't mix different size tires on the same axle except for using a temporary spare. Because of differences in tire size designation nomenclature (for example: P-metric vs. alpha numeric) tires having the same dimensions will have different designations. So always consult a tire dealer before using tires of different size designations on the same axle. And never put on smaller tires than the manufacturer recommends.

Need we remind you not to mix different tire constructions (diagonal, belted bias or radial) on the same axle? Add the line "except for temporary use of a spare tire" to the warning.

On station wagons and all vehicles used to tow trailers, the same size and construction tires should be used all the way around. These vehicles may also require tires that are rated Load Range D or Extra Load P-types.

For your own safety, try to keep tires that are equally worn — tires having approximately the same tread depth — on the same axle.

Rotating tires of different sizes and construction on a vehicle is paramount to mixing, so be certain to recheck this guide for permissibility of the relocated tires.

continued

With the advent of cars with relatively smaller trunks has come the special emergency or temporary-use spare tire. As always, the owner's manual should be consulted for details on their use. Basically, only operate the vehicle on a temporary spare long enough to get to a service facility for tire repair or replacement with one of the proper size and construction.

Remember to follow the manufacturer's recommendations on tire mixing — unless you want to end up a skeleton (picked clean) on some sorcerer's cave wall.

RECOMMENDED TIRE COMBINATIONS

For both front and rear wheel drive vehicles.

Tires of different basic construction — diagonal (bias), belted bias and radial — may vary in series (profiles), dimensions and ride characteristics. These differences may adversely affect vehicle handling characteristics if tires are mixed improperly.

PREFERRED: For best all-around car handling performance, tires of the same size and construction should be used on all wheel positions.

ACCEPTABLE: But not preferred applications. Consult the car owner's manual and do not apply if vehicle manufacturer recommends against this application.

NO: NOT RECOMMENDED.

Chart courtesy of the Rubber Manufacturers Association

CONSTRUCTION		FRONT TIRES (Read DOWN for Rears)											
		DIAGONAL (BIAS)				BELTED BIAS				RADIAL			
REAR TIRES (Read ACROSS for Fronts)		Numeric & 80 Series	78/75 Series	70 Series	60/50 Series	Numeric & 80 Series	78/75 Series	70 Series	60/50 Series	Numeric & 80 Series	78/75 Series	70 Series	60/50 Series
DIAGONAL (BIAS)	Numeric & 80 Series	✪	☆	NO	NO	☆	☆	NO	NO	NO	NO	NO	NO
	78/75 Series	☆	✪	☆	NO	☆	☆	NO	NO	NO	NO	NO	NO
	70 Series	☆	☆	✪	NO	☆	☆	☆	NO	NO	NO	NO	NO
	60/50 Series	☆	☆	☆	✪	☆	☆	☆	☆	NO	NO	NO	NO
BELTED BIAS	Numeric & 80 Series	☆	☆	NO	NO	✪	☆	☆	NO	NO	NO	NO	NO
	78/75 Series	☆	☆	☆	NO	☆	✪	☆	NO	NO	NO	NO	NO
	70 Series	☆	☆	☆	NO	☆	☆	✪	NO	NO	NO	NO	NO
	60/50 Series	☆	☆	☆	☆	☆	☆	☆	✪	NO	NO	NO	NO
RADIAL	Numeric & 80 Series	☆	☆	☆	NO	☆	☆	☆	NO	✪	☆	☆	NO
	78/75 Series	☆	☆	☆	NO	☆	☆	☆	NO	☆	✪	☆	NO
	70 Series	☆	☆	☆	NO	☆	☆	☆	NO	☆	☆	✪	NO
	60/50 Series	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	✪

✪ Preferred ☆ Acceptable

The Sidewall Story

NAME OF TIRE
P 195/75R14
TREADWEAR 140 TRACTION B TEMPERATURE C
DOT XXXX XXXX
TREAD 4 PLIES
• 2 XXXX CORD • 2 XXXX CORD
MAX LOAD 635 Kg (1400 LBS) • 240 kPA (35 PSI) MAX PRESS.
• STANDARD LOAD • TUBELESS • RADIAL • XXXX CORD • SIDEWALL 2 PLIES
MANUFACTURER'S NAME

Molded into the sidewall of every tire is a story. This story includes the name of the tire, its size, whether it is tubeless or tube type, the maximum load and maximum inflation pressure, the important safety warning and much more.

Although not pictured here, the safety warning usually reads like this:

SAFETY WARNING:

SERIOUS INJURY MAY RESULT FROM: TIRE FAILURE DUE TO UNDERINFLATION/OVERLOADING — FOLLOW OWNER'S MANUAL OR TIRE PLACARD IN VEHICLE. EXPLOSION OF TIRE/RIM ASSEMBLY DUE TO IMPROPER MOUNTING — ONLY SPECIALLY TRAINED PERSONS SHOULD MOUNT TIRES.

Shown here is the sidewall of a popular "P-metric" size auto tire. The "P" stands for passenger; "195" represents the width of the tire in millimeters; "75" is the ratio of height to width of the tire as a percent; "R" means radial and "14" is the diameter of the rim in inches. A "B" in place of the "R" means the tire is a belted bias construction, while a "D" would mean diagonal (bias) construction.

On the next line toward the center of the tire is "Standard Load" which identifies the load and inflation limits for a given size tire when used in a specific type of service. The letters "DOT" certify compliance with all applicable Department of Transportation safety standards. Adjacent to this is a tire identification or serial number. The first two characters identify the tire manufacturer; the remaining characters identify size, type and date of manufacture.

The sidewall also shows the type of cord and the number of plies in the sidewall and under the tread. In this case there are four tread plies, two of XXXX and two of XXXX; and two sidewall plies of XXXX.

The inner-most line starts with the word "Radial." All tires which have radial construction must show the word "radial" on the sidewall. Next, tires are marked either "tube-less" or "tube-type" accordingly.

"Max Load 635 kg (1400 lbs) @ 240 kPa (35 psi) maximum pressure" indicates the tire's load limits and maximum *cold* inflation. The maximum load is in kilograms (kg) and pounds (lbs), while the maximum *cold* inflation pressure is in kilopascals (kPa) and pounds-per-square inch (psi).

Also, any combination of the letters M and S such as "M/S" indicates the tire meets the Rubber Manufacturers Association's definition for a mud and snow tire.

Before the auto and tire industries began converting to the international metric system, tires were marked in "alpha-numeric" sizes. Some alpha-numeric tires are still available. In these sizes, the earlier the letter in the alphabet ("A," "B," "C," etc.) the smaller the size and load-carrying capability of the tire at a given pressure.

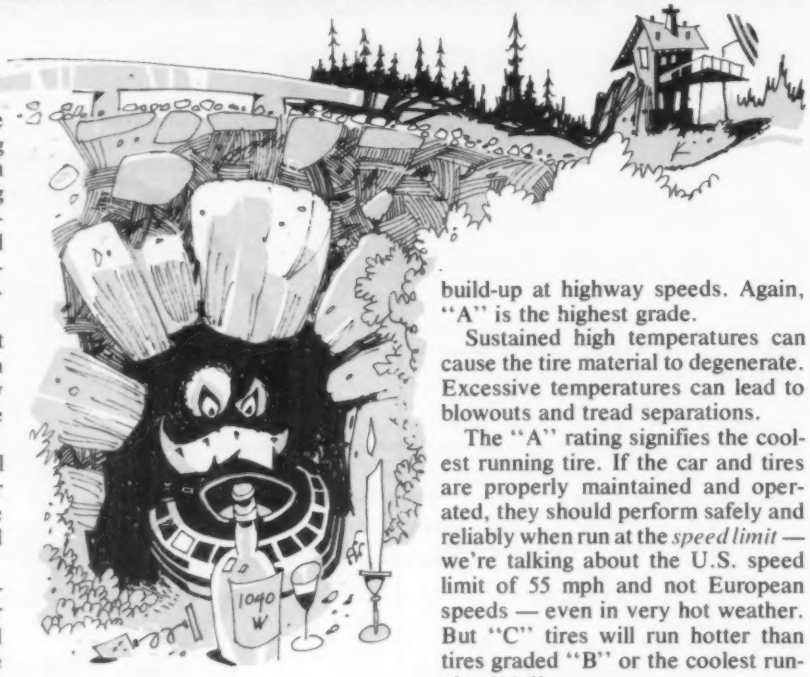
Before alpha-numeric sizes, tires were marked with numerical designations such as 7.75-14. The first number was the approximate cross-section width in inches; the second was the diameter of the rim.

Other information molded into the tire's sidewall can include country of origin, European speed ratings, European standards code, patent numbers, mold identification and Uniform Tire Quality Grading (more about the latter in the "UTQG" story on page 12.)

continued

continued ■

UTQG



No, UTQG isn't the name of the troll that lives under the parking area for the tech editor's mountain cabin. UTQG is a system for testing and grading tires by their manufacturers, established by the National Highway Traffic Safety Administration (NHTSA). UTQG stands for Uniform Tire Quality Grading.

While the current law requires that the UTQG rating be molded into each tire, the manufacturers aren't happy with the system and it could be changed.

Under UTQG, each tire is graded with a series of numbers and letter symbols indicating comparative treadwear, wet weather traction and resistance to internal heat build-up.

If you look carefully at a tire sidewall, you'll find a three-digit number and two letters — usually rather small and easy to miss. The numbers are from 050 to 270. The letters are A, B, or C. Like this: 100BA, or 250AA, or 080BC.

The number indicates the relative tread life. The higher the number, the longer the wear and the greater the mileage you should receive.

The control number is 100. It indicates approximately 30,000 miles under test conditions on the Government Test Course. So a tire rated at 170 gave 70 percent more miles on this test course than the one rated 100. And you should be able to get 70 percent more miles on the 170 than you would on a 100, provided . . . . Provided you keep the tires properly inflated, the vehicle wheels aligned and tires balanced. Failure to properly care for your tires will greatly reduce the treadwear and can also create a safety hazard.

Your own driving habits also have a lot to do with tread wear. If you consistently make "jack rabbit" starts and stops, and fast tire-screeching turns, your tires won't last nearly as long. In fact, a tire that normally would deliver 30,000 miles under ideal conditions and a smooth driver, might last a heavy-foot only 14,000 miles.

But under the UTQG system, if you got 30,000 miles out of a 100-graded tire, you might expect to get 51,000 miles from a 170 tire. Of course, this grade indicates only that one tire can be expected to produce more mileage than another. It doesn't really indicate what the mileage will be.

The first letter, A, B or C indicates the relative skid resistance of the tire on wet pavement. Just like in school, "A" is best, "C" is worst. In other words, an "A" tire will allow you to stop your car on *wet* roads faster and in a shorter distance than tires graded "B." Tires graded "C" have poor traction on wet roads.

Regardless of the traction grade, a tire with badly worn tread will lose much of its stopping ability on a wet road. And a tire with less than 1/16th-inch of tread — a bald tire — is down-right dangerous on wet roads.

The second letter, also A, B or C, indicates resistance to internal heat build-up at highway speeds. Again, "A" is the highest grade.

Sustained high temperatures can cause the tire material to degenerate. Excessive temperatures can lead to blowouts and tread separations.

The "A" rating signifies the coolest running tire. If the car and tires are properly maintained and operated, they should perform safely and reliably when run at the *speed limit* — we're talking about the U.S. speed limit of 55 mph and not European speeds — even in very hot weather. But "C" tires will run hotter than tires graded "B" or the coolest running "A."

Underinflation or overloading will overheat and damage any tire — even an "A" — and greatly increase the likelihood of a blowout.

Now, don't judge a tire's quality only by how long it wears. A tire rated 250CC or 250CB, would not be a good buy for most people. A tire rated 140AA is preferable to one rated 160BC, or 160CB, or even 160BB. In fact, we would recommend not buying any "C" rated tires except if you plan to sell the car real soon or you have a valid reason* for wanting a cheap tire.

Federal law sets very severe penalties against a manufacturer for overgrading a tire. As a result, most tire manufacturers, except Uniroyal, are opposed to UTQG and grade their tires conservatively. This tends to distort some ratings.

Finally, test accuracy can't be as precise as we'd like to see it but any ratings are better than the total ignorance resulting from the lack of any standard offered by the tire industry.

Come to think of it, maybe UTQG is that troll's name.

** There is NO valid reason for buying a cheap tire.*

Rotation

Tires are rotated to achieve a more uniform wear for all tires on the vehicle. However, before you rotate tires determine the cause of any unusual wear and correct any alignment, inbalance or other mechanical problems.

Refer to your car owner's manual before rotating the tires. Also, some tire manufacturers prefer one rotation pattern over another for radial tires. So check with your tire dealer for the rotation pattern best suited for your car and tires.

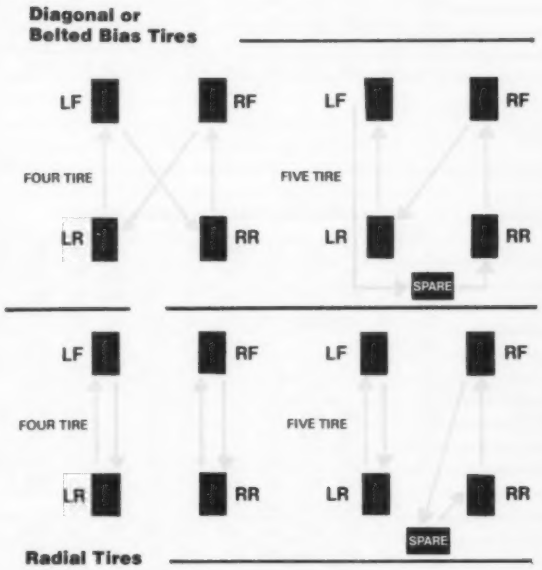
Additionally, some car and tire makers are recommending against rotating tires on front-wheel-drive vehicles unless there has been a wear problem. They say that the rear tires may never have to be replaced during the life of the vehicle.

Shown here are two popular types of rotation patterns. Use the pattern that best suits your needs.

If tires of different size or construction (diagonal, belted bias or radial) are mixed on the vehicle, refer to the Recommended Tire Combinations guide in the "Mixing" story on page 9 before rotating. And never include special temporary spare tires in rotation patterns.

After rotating the tires, adjust their individual pressures to the car or tire manufacturer's recommendations according to the tire's new location.

continued



Rotation patterns for diagonal or belted bias tires (above) and radial tires (below).

(right)
When snow tires are installed, the regular tread radial tires should be marked left or right on the outer sidewall so that they can be returned to their original positions in the spring. This is to maintain the rotation of the radial tire consistent with its original direction. And don't forget to mark the radial snow tread tires, too.

continued ■

Gauging Inflation

Proper inflation is the most important requirement for maximum tire safety and mileage. Correct tire inflation provides proper sidewall deflection and safe operating temperature for the tires. It makes tires wear longer, saves fuel and helps prevent accidents. You must keep the right amount of air in your tires at all times.

The "right amount" of air is the pressure specified by the vehicle manufacturer for the front and rear tires on your particular model car. You can find this correct air pressure on the tire placard, or sticker, in the

Tire Load/Inflation Tables For Popular Automobile Tire Sizes

Tables courtesy Tire Indu

TIRE LOAD/INFLATION TABLE **12" Rim Diameter**

ALPHA* SIZES All Const.	EUROPEAN METRICS	P-METRIC SIZES 80 Series	75 Series	70 Series	65 Series	60 Series	55 Series	50 Series	Air Pressure in P.S.I./Max. Loads in Pounds 18	20	22	23	24	26	28	29	30	32	35	36
	145R12								565	600	635	650	665	695	725	740	755	780	822	835
6.00-12									545	605	655	680	705	735	785	800	815	845	890	905
	155R12								630	665	700	717	735	770	800	817	835	865	910	925
		P155/80R12							661	694	728	750	761	794	816	838	849	871	915	

*For example, A-13 represents all aspect ratios (e.g., A78-13, A70-13, AR78-13, AR70-13, etc.)

TIRE LOAD/INFLATION TABLE **13" Rim Diameter**

ALPHA* SIZES All Const.	EUROPEAN METRICS	P-METRIC SIZES 80 Series	75 Series	70 Series	65 Series	60 Series	55 Series	50 Series	Air Pressure in P.S.I./Max. Loads in Pounds 18	20	22	23	24	26	28	29	30	32	35	36
	145R13								630	665	700	717	735	770	800	817	835	860	905	920
		P145/80R13							628	661	683	705	716	750	772	783	805	827	860	
	165/70R13								730	750	770	782	795	815	835	847	860	880	910	920
				P165/70R13					683	716	750	772	783	816	838	860	871	904	937	
	155R13								690	730	770	790	810	845	885	900	915	950	1000	1015
		P155/80R13							705	739	772	783	805	838	860	882	893	926	959	
	175/70R13								820	845	865	877	890	910	935	945	955	980	1012	1025
			P165/75R13						728	772	805	816	838	871	904	915	937	959	1003	
	165R13								730	770	820	840	860	900	930	950	970	1010	1060	1080
				P175/70R13					750	794	827	849	860	893	926	948	959	992	1036	
A-13									770	810	860	880	900	940	980	1000	1020	1060		
		P165/80R13							783	816	860	871	893	926	959	981	992	1025	1069	
						P195/60R13			783	827	860	882	904	937	970	981	1003	1036	1080	
	185/70R13								915	940	965	977	990	1015	1040	1052	1065	1090	1127	1140
								P215/50R13	794	838	871	893	904	948	981	992	1014	1047	1091	
			P175/75R13						805	849	882	904	926	959	992	1014	1025	1058	1113	
	175R13								840	890	930	955	980	1030	1070	1090	1110	1150	1210	1230
B-13									840	890	930	955	980	1030	1070	1090	1110	1150		
				P185/70R13					827	871	915	926	948	992	1025	1036	1058	1091	1135	
					P195/65R13				849	882	926	948	970	1003	1047	1058	1080	1113	1157	
						P205/60R13			849	893	937	959	981	1014	1058	1069	1091	1124	1179	
		P175/80R13							860	904	948	970	981	1025	1058	1080	1102	1135	1179	
	195/70R13								1020	1045	1070	1085	1100	1125	1155	1167	1180	1210	1252	1265
			P185/75R13						682	926	970	992	1014	1058	1091	1113	1135	1168	1224	
				P195/70R13					904	948	992	1014	1036	1080	1113	1135	1157	1190	1246	
C-13									890	950	1000	1025	1050	1100	1140	1165	1190	1230		
								P235/50R13	926	970	1014	1036	1058	1102	1135	1157	1179	1213	1268	
	185R13								930	980	1030	1055	1080	1130	1180	1205	1230	1270	1335	1360
						P215/60R13			926	970	1014	1036	1058	1102	1146	1168	1179	1224	1279	
				P205/70R13					992	1036	1080	1113	1135	1179	1224	1235	1257	1301	1356	
		P185/80R13							948	992	1036	1058	1080	1124	1168	1190	1213	1246	1301	

*For example, A-13 represents all aspect ratios (e.g., A78-13, A70-13, AR78-13, AR70-13, etc.)

TLI-582

vehicle. It is permanently affixed to the vehicle — on the edge of a door, on a door jamb surface or the glove compartment door.

The tire information placard will tell you how much air pressure to keep in your front and rear tires. Often there is an optional set of pressures for less than full load.

For increased gas mileage and optimum tire performance, add 2 or 3 psi more than indicated on the information placard. However, never exceed the maximum inflation pressure as indicated on the tire sidewall.

continued

Industry Safety Council

TIRE LOAD/INFLATION TABLE **14" Rim Diameter**

ALPHA* SIZES All Const.	EUROPEAN METRICS	P-METRIC SIZES 80 Series	75 Series	70 Series	65 Series	60 Series	55 Series	50 Series	Air Pressure in P.S.I./Max. Loads in Pounds 18	20	22	23	24	26	28	29	30	32	35	36
	145R14								635	675	715	732	750	785	815	832	850	880	925	940
	155R14								740	780	820	840	860	900	940	955	970	1010	1060	1080
	165R14								810	860	910	935	960	1000	1040	1060	1080	1120	1185	1200
	175/70R14								855	880	905	915	925	950	975	987	1000	1025	1062	1075
		P165/80R14							816	860	904	926	937	981	1014	1036	1047	1080	1124	
					P185/65R14				816	860	893	915	937	970	1003	1025	1036	1069	1124	
						P195/60R14			827	871	915	926	948	981	1025	1036	1058	1091	1135	
B-14									840	890	930	955	980	1030	1070	1090	1110	1150		
	185/70R14								960	990	1015	1030	1045	1070	1100	1115	1130	1155	1195	1210
			P175/75R14						849	893	937	959	970	1014	1047	1069	1080	1124	1168	
				P185/70R14					871	915	959	981	1003	1036	1080	1091	1113	1146	1201	
		P175/80R14							904	948	992	1014	1036	1080	1124	1135	1157	1190	1246	
C-14	175R14								890	950	1000	1025	1050	1100	1140	1165	1190	1230	1300	1320
	195/70R14								1055	1090	1120	1137	1155	1185	1220	1235	1250	1280	1325	1340
			P185/75R14						937	981	1025	1047	1069	1113	1157	1168	1190	1235	1290	
				P195/70R14					959	1003	1047	1069	1091	1135	1179	1201	1224	1257	1312	
D-14									950	1010	1070	1095	1120	1170	1220	1245	1270	1320		
					P205/65R14				970	1014	1069	1091	1113	1157	1201	1213	1235	1279	1334	
						P215/60R14			981	1025	1069	1091	1124	1168	1201	1224	1246	1290	1345	
	185R14								980	1040	1100	1130	1160	1210	1260	1285	1310	1360	1430	1450
		P185/80R14							992	1047	1091	1124	1146	1190	1235	1246	1268	1312	1367	
E-14	205/70R14								1010	1070	1130	1160	1190	1240	1300	1325	1350	1400	1465	1490
			P195/75R14						1025	1069	1124	1146	1168	1213	1257	1279	1301	1345	1400	
				P205/70R14					1036	1091	1146	1168	1190	1235	1279	1301	1323	1367	1433	
								P245/50R14	1047	1091	1146	1168	1190	1246	1290	1312	1334	1378	1433
					P215/65R14				1047	1102	1157	1179	1201	1257	1301	1323	1345	1389	1444	
						P225/60R14			1058	1113	1157	1179	1213	1257	1301	1323	1345	1389	1455	
	195R14								1090	1150	1210	1240	1270	1330	1390	1415	1440	1500	1565	1590
F-14	215/70R14								1090	1160	1220	1250	1280	1340	1400	1425	1450	1500	1580	1610
			P205/75R14						1113	1168	1224	1246	1279	1323	1378	1400	1422	1466	1532	
				P215/70R14					1124	1179	1235	1268	1290	1345	1389	1411	1444	1488	1554	
						P235/60R14			1135	1190	1246	1279	1301	1356	1400	1422	1455	1499	1565	
G-14	205R14								1180	1250	1310	1345	1380	1440	1500	1530	1560	1620	1705	1730
								P265/50R14	1190	1257	1312	1345	1367	1422	1477	1499	1521	1576	1642
							P255/55R14		1213	1268	1334	1356	1389	1444	1499	1521	1543	1598	1664	
			P215/75R14						1201	1268	1323	1356	1389	1433	1488	1521	1543	1587	1664	
				P225/70R14		P245/60R14			1224	1279	1345	1367	1400	1455	1510	1532	1554	1609	1675	
H-14									1290	1360	1440	1475	1510	1580	1650	1680	1710	1770		
			P225/75R14						1301	1367	1433	1466	1499	1554	1609	1642	1664	1720	1797	
				P235/70R14					1312	1378	1444	1477	1510	1565	1620	1653	1675	1731	1808	
J-14									1350	1430	1500	1540	1580	1650	1720	1755	1790	1860		
				P245/70R14					1411	1488	1554	1587	1620	1687	1742	1775	1808	1863	1940	
						P275/60R14			1488	1565	1642	1675	1709	1775	1841	1874	1907	1962	2050	

*For example, A-13 represents all aspect ratios (e.g., A78-13, A70-13, AR78-13, AR70-13, etc.)

TLI-582

To keep tires properly inflated, use an accurate tire pressure gauge. You can't tell when tires are "low," or underinflated, just by looking at them. And air towers at service stations are often inaccurate due to exposure or abuse.

You should have your own personal hand tire gauge to be sure. You can buy an accurate gauge from your tire dealer, auto supply store or other retailer.

Check your tires at least once a month and before every long trip. Check them when they are cold; that is, before they have been driven a mile, or have been at rest for more than three hours. And don't forget to check your spare tire, too.

For details on how to properly inflate your tires see the May 1982

TIRE LOAD/INFLATION TABLE **15" Rim Diameter**

ALPHA* SIZES All Const.	EUROPEAN METRICS	P-METRIC SIZES							Air Pressure in P.S.I./Max. Loads in Pounds											
		80 Series	75 Series	70 Series	65 Series	60 Series	55 Series	50 Series	18	20	22	23	24	26	28	29	30	32	35	36
	155R15								735	780	825	845	865	905	940	960	980	1015	1067	1085
		P155/80R15							772	816	860	871	893	926	959	981	992	1025	1025	1069
	175/70R15								915	940	965	977	990	1015	1040	1052	1065	1090	1127	1140
	165R15								820	870	910	935	960	1000	1050	1070	1090	1130	1185	1200
B-15									840	890	930	955	980	1030	1070	1090	1110	1150		
		P165/80R15							860	904	948	970	992	1025	1069	1080	1102	1135	1190	
			P175/75R15						893	937	981	1003	1025	1058	1102	1124	1135	1179	1224	
C-15	175R15								890	950	1000	1025	1050	1100	1140	1165	1190	1230	1295	1320
				P185/70R15					915	959	1003	1025	1047	1091	1135	1146	1168	1213	1257	
D-15	195/70R15								950	1010	1070	1095	1120	1170	1220	1245	1270	1320	1385	1410
			P185/75R15						981	1025	1080	1102	1124	1168	1213	1235	1246	1290	1345	
	185R15								1010	1070	1130	1155	1180	1240	1290	1315	1340	1390	1455	1480
E-15	205/70R15								1010	1070	1130	1160	1190	1240	1300	1325	1350	1400	1465	1490
						P215/60R15			1025	1080	1124	1146	1168	1224	1268	1290	1312	1345	1411	
			P195/75R15						1069	1124	1179	1201	1224	1279	1323	1345	1367	1411	1477	
	195R15								1090	1150	1210	1240	1270	1330	1380	1410	1440	1490	1565	1590
								P245/50R15	1091	1146	1201	1224	1257	1301	1345	1367	1400	1444	1499	
F-15	215/70R15								1090	1160	1220	1250	1280	1340	1400	1425	1450	1500	1580	1610
					P215/65R15				1102	1157	1213	1235	1257	1312	1356	1378	1411	1455	1510	
						P225/60R15			1102	1157	1213	1246	1268	1312	1367	1389	1411	1455	1521	
		P195/80R15							1146	1201	1257	1279	1312	1356	1411	1433	1455	1499	1565	
			P205/75R15						1168	1224	1279	1312	1334	1389	1433	1466	1488	1532	1598	
	205R15								1170	1240	1300	1335	1370	1430	1490	1520	1550	1610	1690	1720
G-15	225/70R15								1180	1250	1310	1345	1380	1440	1500	1530	1560	1620	1705	1730
				P215/70R15					1179	1246	1301	1323	1356	1411	1455	1488	1510	1554	1620	
						P235/60R15			1190	1246	1312	1334	1367	1422	1466	1499	1521	1565	1642	
								P265/50R15	1246	1312	1378	1400	1433	1488	1543	1565	1598	1642	1720	
			P215/75R15						1268	1323	1389	1422	1444	1510	1565	1587	1609	1664	1742	
							P255/55R15		1268	1334	1389	1422	1455	1510	1565	1587	1620	1664	1742	
						P245/60R15			1279	1345	1400	1433	1466	1521	1576	1609	1631	1687	1753	
				P225/70R15					1279	1345	1400	1433	1466	1521	1576	1598	1631	1675	1753	
H-15	235/70R15								1290	1360	1440	1475	1510	1580	1650	1680	1710	1770	1860	1890
								P275/50R15	1334	1400	1466	1499	1521	1587	1642	1675	1698	1753	1830	
J-15									1350	1430	1500	1540	1580	1650	1720	1755	1790	1860		
			P225/75R15						1367	1433	1499	1532	1565	1631	1687	1720	1742	1797	1874	
						P255/60R15			1367	1433	1510	1532	1565	1631	1687	1720	1753	1808	1885	
				P235/70R15					1378	1444	1510	1543	1576	1642	1698	1731	1753	1808	1896	
L-15									1430	1520	1600	1640	1680	1750	1830	1865	1900	1970		
						P265/60R15			1466	1532	1609	1642	1675	1742	1808	1841	1863	1929	2017	
			P235/75R15						1466	1543	1620	1653	1687	1753	1819	1852	1885	1940	2028	
				P245/70R15					1477	1554	1620	1664	1698	1764	1830	1852	1885	1951	2028	
					P255/65R15				1477	1554	1620	1653	1687	1753	1819	1852	1885	1940	2028	
								P295/50R15	1499	1576	1653	1687	1720	1786	1852	1885	1918	1973	2061	
						P275/60R15			1554	1642	1720	1753	1786	1863	1929	1962	1995	2050	2149	
				P255/70R15					1587	1664	1742	1775	1819	1885	1951	1984	2017	2083	2183	

*For example, A-13 represents all aspect ratios (e.g., A78-13, A70-13, AR78-13, AR70-13, etc.)

TLI-582

DRIVER. Basically, note the amount any tire is underinflated if you must drive over a mile to get air. Then add that amount of air when you reach a service station, using your own gauge.

Air pressure also varies with the outside temperature; about one psi for every 10 degrees Fahrenheit. So don't be surprised when you have to add some air to your tires.

However, never "bleed" or reduce air pressure when tires are hot. It is normal for pressures to increase above recommended cold pressures as a result of driving. A hot tire at or below recommended cold inflation pressure is dangerously underinflated.

And never let air out of tires in an attempt to gain extra traction in snow. It won't work and you'll be left with seriously underinflated tires.

Underinflation is the worst enemy of a tire. It will eventually result in tire failure due to excessive flexing and/or tire heat build-up. If that happens on the road at high speed, you could have an accident resulting in serious injury or even death.

Underinflation also wastes gas. Soft tires "squirm" on the road and make your engine work harder. This also makes the tread wear out faster than it should on the outer tread ribs.

On the other hand, overinflation causes tires to ride hard and makes them more vulnerable to impact damage and weakening of the tire body. And the center tread ribs wear out more rapidly when the tire is overinflated.

Overloading a tire will produce the same results as underinflating it. The tire placard also shows the maximum load which the car will carry on the tire size specified, at the recommended cold air pressures. Be careful not to overload the vehicle. Yes, baggage piled up on top of any vehicle counts in the load.

If you're towing a trailer, remember that some of the weight of the loaded trailer transfers to the towing

continued

(above)
Bulging sidewalls are characteristic of radial tires and make it impossible to visually determine whether radial tires are properly inflated or not. The tire on the right is 33 percent underinflated. As a result, it will run hotter, wear faster and/or unevenly, adversely affect vehicle handling and may fail in service. Furthermore, when operating a car equipped with radial tires, it is often impossible to "feel or hear" a disturbance when a tire has gone flat or near flat. Such unintentional abuse is the most common cause of radial tire failures.

(left)
You must keep the right amount of air in your tires at all times, and the only way to do it is with your own gauge.

vehicle. That reduces the payload which can safely be placed in the towing vehicle. The only sure way to prevent overloading is to weigh, axle by axle, the fully loaded vehicles on reliable platform weight scales.

Load and inflation information for popular auto tire sizes may be obtained from your local tire dealer, or tables may be obtained free by sending a stamped, self-addressed business-size envelope to "Tables," Tire Industry Safety Council, Box 1801, Washington, D.C. 20013.

And if any tire continually needs more air, have it taken off the car and checked to find out why it's leaking. The tire could be damaged, or the wheel, or the valve.

SAFETY CHECK YOUR TIRES!

The Tire Industry Safety Council would like you to personally safety check your tires at least once a month, and to help you do this they have put together a Glove Compartment Tire Safety and Mileage Kit. The kit includes an airpressure gauge, tread depth gauge, spare set of four tire valve caps and a copy of their 12-page Consumer Tire Guide, *Five Keys to Better Tire Mileage and Safety*. The kit comes in a plastic pouch for $2.75 (District of Columbia residents add local sales tax).

Get your kit by sending check or money order to:

TIRE INDUSTRY SAFETY COUNCIL
Box 1801
Washington DC 20013

Cold Weather Driving

Here are some tire tips that should help you with your cold weather driving:

■ **Every time** the outside temperature drops 10 degrees Farenheit, the air pressure inside your tires goes down about one psi. So, check your tire pressure more frequently during cold weather, and add the necessary air to keep them at recommended levels of inflation at all times.

■ **Never reduce** tire pressures in an attempt to increase traction on snow, ice or in mud. It doesn't work and your tires will wind up seriously underinflated.

■ **If one of the drive wheels** becomes stuck, never race the engine because the free spinning drive wheel will spin at twice the speedometer reading. This develops tremendous centrifugal force which could cause the tire to explode or disintegrate and cause personal injury.

■ **In snowy areas,** many cities and counties have "snow emergency" regulations which are invoked during heavy snowfalls. Check with local authorities for the rules in your area. Under some rules, motorists are subject to fines if they block traffic and don't have snow tires or chains on their cars.

■ **You may avoid this** by equipping your car with tires marked "mud and snow" or "M/S" or "M & S" on the sidewall.

■ **If you change** to snow tires, be sure they are the same size and construction type as the other tires on the car. Never put bias or belted bias snow tires on the rear if you have radials on the front.

■ **Don't laugh:** On front-wheel-drive cars, snow tires go on the front — the driving axle.

■ **In areas** where heavy snow falls are frequent, many drivers carry chains for use in emergencies. Even drivers with snow tires carry chains in many areas, especially if hilly or mountainous. Make sure the chains are the proper size for your tires. Otherwise they may damage the sidewall and cause tire failure.

■ **Some states** have time limits on use of studded snow tires or ban them altogether. Before buying studs, check the regulations in your area.

■ **When studded snow tires** are mounted on the front axle of front-wheel-drive vehicles, studded tires should be placed on the rear axle also.

Modern-day wranglers — You can bet these cattle are happy this rancher equipped his light truck with all-terrain, all-season tires.

Tires and RVs

The tires on recreational vehicles require more care for several reasons. One, they carry heavy loads. Two, the vehicles may be sitting for long periods of time when not in use. Three, they are used most often during the hot summer months, which are doubly hard on tires.

The most critical factors in proper care and maintenance are selecting the right tires, using the proper inflation pressure for the load carried, and observing the maximum load and inflation limits.

Proper inflation for the load carried: The load that any tire can safely carry depends upon several variables, including tire size and load range (or ply rating) and inflation pressure. Refer to vehicle manufacturer's recommendations in the owner's manual or placard affixed to the vehicle for tire information.

If passenger tires are used in special applications such as RV's or trailers, they must be inflated to the maximum rated inflation. The maximum load rating, marked on the sidewall, divided by 1.10 gives the maximum vehicle load permitted.

Most trailer tires require higher inflation pressures than passenger car tires, a fact not generally known by service station personnel. Bleeding air from the trailer tires in a misguided attempt to match trailer tire inflation pressures to the lower inflation pressures of passenger car tires may result in underinflation, causing fast or uneven tread wear, trailer instability at high speeds, and extreme heat build-up which can result in tire failure.

Inflation pressures should be checked when tires are cold, since heat generated during driving temporarily increases air pressure, possible 10 to 20 percent above the recommended cold inflation pressure. This is normal so never "bleed" hot tires. The resulting underinflation will be extremely dangerous. The important thing is to make sure the tires are correctly inflated at the start of the trip and are rechecked periodically when they are cold.

Don't overload: When loading a car and any kind of trailer, make an axle check of maximum permissible tire loads as marked on the tire sidewall. Distribute the load in both vehicles to prevent overloading the tires on any axle or wheel position and remember to include the weight of the driver and passengers.

Also remember that some of the weight of the loaded trailer transfers to the rear axle of the towing vehicle thus reducing the payload that can safely be placed on, or on top of, the towing vehicle. Load-leveling hitch devices are available to distribute the hitch load properly between the trailer and the towing vehicle.

The only sure way to prevent overload is to weigh, axle by axle, the fully loaded vehicle on reliable platform weigh scales. Such weighing service is available at many highway weighing stations, building supply depots, coal yards, scrap yards, etc. (consult telephone book "Yellow Pages" under "weighers" or "weighings").

Weigh each axle of loaded vehicles separately. Divide each loaded axle weight by the number of tires on that axle. If actual per-tire load exceeds the per-tire load capacity (as marked on tire sidewall) for tires on that axle, reduce your load to within tire load capacity. If it is impossible to reduce the load, replace the tires with tires of adequate load capacity and, if necessary, replace the wheels with heavy-duty wheels.

Improve stability: A common hazard of trailer towing is trailer "swaying" a wagging motion which generally occurs at higher speeds under conditions the driver may not anticipate. In either case, it may cause the driver to lose control.

Trailer swaying can be started from a sharp maneuver of the car or a sudden gust of wind on the side of the trailer. Once begun, swaying can magnify rapidly to the violent point. Trailers with high profiles are more susceptible to swaying than those with lower profiles and lower centers of gravity.

To improve stability and reduce trailer swaying:

1. Never mix tires of different construction (bias, belted bias or radial) on the same axle. Radial ply tire usage on recreational type trailers must be approved by the tire and vehicle manufacturers.

2. Rear tires on the towing vehicles should be mounted on the widest rims recommended by the vehicle manufacturer. Rear tire inflation should be increased to improve stability and to compensate for additional load transferred through the hitch, up to the maximum inflation rating of the tire.

3. In most cases, the tongue weight at the hitch point should be at least 10 percent of the total trailer weight. (Check vehicle manufacturer's recommendations.) Particular attention should be given to load distribution. Avoid uneven front-to-rear and side-to-side loading. Take special care when loading a heavy article such as a motorcycle to be sure that the minimum recommended tongue weight is maintained.

4. With all types of hitches, use the auto manufacturer's trailer towing

continued

Service on split-rim wheels, such as those on motor homes, should be accomplished only by trained truck tire experts.

Overinflation causes tires to run hard and makes them more vulnerable to impact and other road hazard damage. It also causes irregular wear. **Underinflation** causes abnormal tire deflection, which builds up excessive heat, running the risk of failure. It also causes irregular wear. **Proper inflation:** The correct profile for full contact with the road.

Pay attention to proper inflation of the tires and load balance to avoid trailer swaying at high speeds.

packages to improve vehicle ride and stability. Use a friction-type, anti-sway bar attached between trailer and towing vehicle. In some cases, helper springs or load leveling shock absorbers are also desirable.

5. The steering system must be properly aligned and maintained to provide minimum play.

Truck Campers: The weight of the camper unit and its contents may require heavy-duty truck tires and wheels, since these vehicles frequently carry excessive weight and are often driven over unpaved roads. Be sure to consider uneven weight distribution, e.g. water-tank, in determining tire load. If a light truck is purchased with the intention of adding a camper body later, the vehicle manufacturer or dealer should be consulted for recommendations on the adequacy of the truck's tires, valves and wheels to carry the additional load. A special heavy-duty suspension package may be required.

Motor homes: Since motor homes are truck or bus-type vehicles, they should be equipped with adequate truck tires and wheels. A warning: Service on these split-rim wheels can be extremely dangerous. A split rim can come apart with sufficient force to hurl a bowling ball a mile away. Therefore, service should be handled only by a truck expert. Further, if your tires are below 80 percent of the recommended air capacity you shouldn't try to air them up yourself. Leave that to the experts, too.

Radial tire rim combination: Matching radial tires with rims and wheels must be done with extreme care. Not all rims and wheels are approved for use with radial tires. Use of a non-approved rim or wheel could result in a fatigue failure of the wheel and a possible accident. It is therefore extremely important to consult the wheel and rim manufacturer or his local distributor, or refer to the Tire and Rim Yearbook to determine which rims or wheels are acceptable for use with a specific radial ply tire.

With the same load and inflation factors, radial tires can place higher stresses on rims and wheels than do bias tires. Radial tires also require higher inflation pressure (5 psi more) than bias tires carrying an equal load.

Rim selection: Tires are designed for use on rims which meet industry standards. To insure proper tire-to-rim fit and tire mountability, vehicle manufacturers and users must select rims that comply with these standards. Load and cold inflation pressure imposed on the rim and wheel must not exceed the rim and wheel manufacturer's recommendations, even though the tire may be approved for a higher load and inflation.

Tire inspection: Tires should be inspected regularly for excessive or irregular tread wear, bulges, fabric breaks, cuts or other damage. Remove any nails, stones, glass, etc. embedded in the tread to prevent flats. Neglected minor damage can lead to tire failure. Replace tires when tread is worn to 1/16" depth in two or more adjacent grooves, or to the level of tread wear indicators molded into the bottom of tread grooves.

Give tires a rest: When recreational vehicles are out of service for long periods of time, the vehicle should be put on blocks and the wheel assemblies removed and stored in a cool, dry place where the tires will not be exposed to direct sunlight, which will cause weather checking. The air pressure of stored tires should be reduced to 10 psi.

Speed, spares and flats: Many states have speed limits and other operating restrictions for trailers and truck-type vehicles. Always observe local regulations for your type of vehicle.

All trailer owners should carry a spare tire and wheel assembly, especially if they expect to get off the beaten track. Some tires sizes may not be readily available in remote areas.

In addition to the usual tire changing equipment, it's a good idea to have wheel chocks (for the opposite wheel) and short lengths of lumber for supporting the jack on uneven or soft ground.

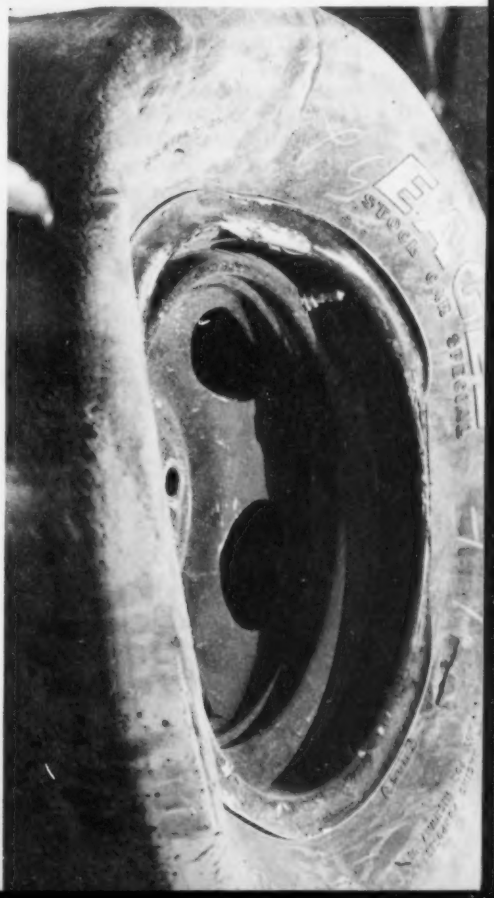
If you have a flat, be sure to have it removed from the wheel and inspected by an experienced tire serviceman to determine if the tire has been damaged internally.

PRO Lessons

You can learn a lifetime's lessons about tires at any major stock car race.

(left, above)
Short as it is, a racing tire's life becomes even shorter if it isn't inflated correctly or starts losing air. The extra feelings the racing driver has for his equipment will tell him that something is wrong and the tire will be junked in a fast pit stop.

(above, right)
Guardrails, walls and other cars represent the same dangers to racing rubber that curbs and potholes to do your street tires: flat-causing impacts and cuts.



A stripped lug nut that made the left front wheel loose enough to rub the tire on the fender until it blew spelled the start of back luck for Bobby Allison. A flat right front tire followed and then a third tire, the left rear, went flat.

Wheel Torque:

Torque Is More Than A Figure of Speech

All wheels are not created equal in their need for torque. Torque being a turning or twisting effort usually measured in foot-pounds (ft-lbs). What's right for a Chevy may be too much for a Renault or too little for a Vanagon.

Too little torque and the lug nuts can work themselves loose while you're driving.

Too much torque can shear lug studs, warp brake drums or rotors, and distort wheels. Not to mention where it leaves you when you have a flat tire and want to remove the wheel.

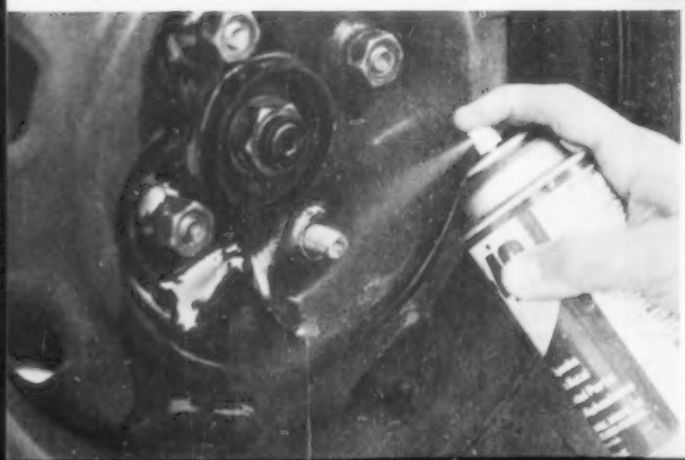
Most American cars with standard five-bolt wheels require 90-plus ft-lbs of torque. So most tire stores have pre-set automatic air-powered wrenches. These automatic wrenches are fine for most U.S.-built cars. They are the fastest way to remove and mount wheels.

Power wrenches apply the same torque to all the lug nuts of any car. Regardless of whether your wheels are stock steel units or expensive alloy wheels, they'll get the same torque.

If your car and wheels match the torque setting of a dealer's automatic impact wrench, fine. And, as far as many "mechanics" are concerned, if they don't, well — that's fine, too. If your wheels need more or less torque than the power wrenches produce, the proper way to do it is with a hand-held torque wrench. If the tire store employees can't be bothered with this, then ask them to only tighten the lugs by hand, and you do the final work.

All you'll need is a torque wrench and a little knowledge. Torque wrenches are available at very reasonable prices in the exchange, discount stores, department stores, parts stores, tool shops . . . any place that sells tools.

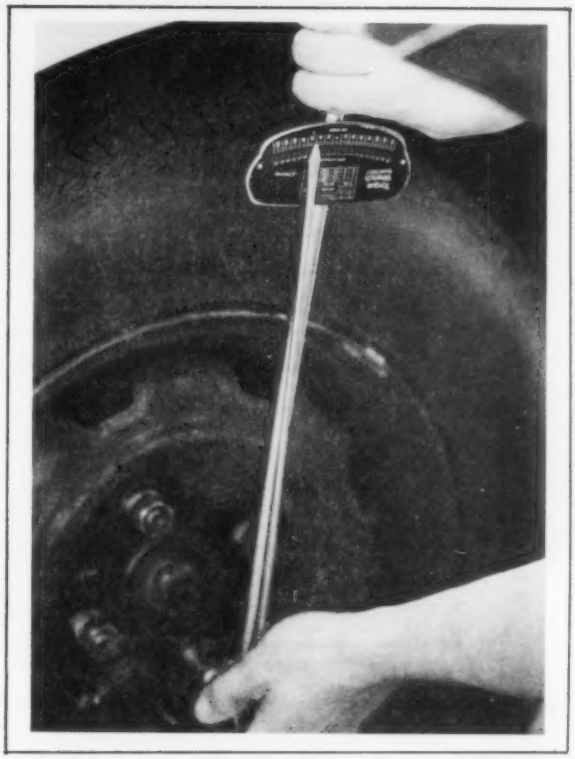
Using the correct size socket that is in good condition is a must to get accurate torque readings.



(left)
Never torque a dry thread. If you're using engine oil or grease as a lubricant, increase the torque by 20 percent.

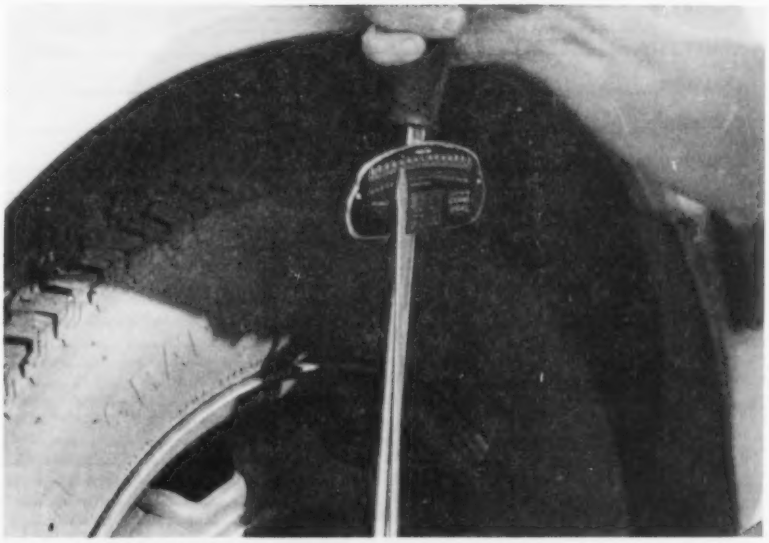
EASY FAST and very often WRONG

First, tighten all bolts to ⅓ final full torque. In other words, if you're aiming for 75 ft-lbs, this first time around you'll be tightening to 25 ft-lbs.



Then re-tighten all bolts to ⅔ final torque.

Re-righten all bolts to full torque in proper sequence. Proper sequence is bolts opposite each other, not adjacent to one another.



Now re-tighten to full torque again in reverse sequence. This insures that no bolts have been missed.

continued

continued

MAKE	MODEL & YEAR	FT-LBS TORQUE
ALFA ROMEO	1982	82-107
	pre-82	
	Mag Wheels	72
	Steel Wheels	50
ARIES	All	80
ARROW	Steel Wheels	51-58
	Alum Wheels	58-72
ASTRE	All	80
AUDI	4000 81-82	65
	5000 78-82	80
	100	87
	Coupe	65
	Fox 78	65
	All 76 & 77	65
	Fox 73-75	58
	70-75 except Fox	80
AUSTIN	Mini	29-35
	Marina 73-74	38-42
	America 69-71	42
	All others	45
AUSTIN-HEALY	Sprite	40-45
	100 & 3000	50-60
BMW	Wheel nuts	59-65
	Wheel bolts	65-80
BOBCAT	All	80-105
CAPRI	Conical nuts	63-85
	Flat nuts (Alum)	85-103
CHALLENGER	Steel Wheels	51-58
	Alum Wheels	58-72
CHEVETTE	All	70
CHEVY LUV	All	65
CITATION	All	100
CITROEN	D, DS & SM	58-72
CHAMP & COLT	Steel Wheels	51-58
	Alum Wheels	58-72
CORTINA	Conical Nuts	63-85
	Flat Nuts (Alum)	85-103
CRICKET	All	55
DAIMLER	1968-74	40-60
	1975-82	50-60
DATSUN	Passenger cars	58-72
	Trucks	87-108
FIAT	850 71-73	51
	124 71-74	51
	124 75-81	65
	128	51
	X1/94½" Wheels	51
	X1/9 5" Wheels	64
	131 Brava	65
	Spider 2000	65
	Strada	64

MAKE	MODEL & YEAR	FT-LBS TORQUE
FIESTA	Conical Nuts	63-85
	Flat Nuts (Alum)	85-103
HONDA	600	32
	Civic	58
	Accord 76-81	58
	Prelude	80
	Accord 82	80
HORIZON	All	80
ISUZU	I-Mark	
	Steel Wheels	50
	Alum Wheels	90
	Pick-Up	65
JAGUAR	68-74 & 82	40-60
	75-81	50-60
JENSEN	Healy & GT	50
	Interceptor	55
LANCIA	Beta	64
	Scorpion	65
LOTUS	Elite, Eclat, Sprint, Esprit,	51
	Esprit	55
MG	Midget	44-46
	B	60-65
MAZDA	Pick-ups	58-65
	Passenger Cars	65-72
	Alum Wheels	65-80
	RX7	65-80
	GLC	65-80
	626	65-85
	B2000, B2200	56-65
MERCEDES	600	122
	All Others	72
MONZA	Ex-Alum Wheels	80
	Alum Wheels	90
MORRIS	All	42
MUSTANG	All	80-105
OMNI	All	80
OPEL	69-71 & 73-75	65
	72 ex-1900	72
	72 1900	75
	76-79	50
PEUGEOT	304, 404, 504, 505, 604 Steel Wheels	44
	504, 505, 604 Mag Wheels	50-61
PINTO	All	80-105
PORSCHE	924 Steel Wheels 78-81	80
	924 Alloy Wheels 78-81	94
	911, 928	94
	Alum Wheels 68-77	94
	924 14x5" Wheels	77
	924 14x6" Wheels	90

continued

MAKE	MODEL & YEAR	FT-LBS TORQUE
RELIANT	All	80
RENAULT	Le Car	40
	18i	59
	All Others	40-45
ROVER	TC	45
	3500 Early	50
	3500 80-81	60
	3500 82	66
SAAB	95, 96, 97	58-72
	99	65-80
	900 79-82	65-80
SAPPORO	Steel Wheels	51-58
	Alum Wheels	58-72
SIMCA		51-58
SUBARU	72-74	40-54
	75-82	58-72
SUNBIRD	All	80
TOYOTA	All	66-86
TRIUMPH	Spitfire	48
	TR7 75-80	75
	TR8	75
VEGA	Ex-Alum Wheels	80
	Alum Wheels	90
VW	Type 1, 3 & 4 bolt M14x15 thread	87-94
	Type 1, 3 & 181 bolt M12x15 thread	72
	Type 2 Bolt	94
	Type 1 Nut	87-101
	Rabbit, Scirocco, Dasher, Jetta, Quantum and Pickup	65
	Vanagon 80	94
	Vanagon 81-82	123
VOLVO	All	85

SEATBELTS SAVE

By MARIE L. RADLOFF

(reprinted from *Northern Light*
K.I. Sawyer AFB, Mich.)

Photo by TSgt Stephen Radloff

It's been a long day at work and as my husband, children and myself are riding home in our car on Engman Lake Road, I'm thinking about what I'm going to cook for supper. Suddenly, as we're approaching a sharp curve, I notice a car is heading toward us — in our lane!

I shout to Steve, my husband, "That car's in our . . ." Before I can even finish the sentence, "Blam" a sudden force stops our car and then there is a quiet stillness.

I can't breathe, only short gasps are coming from my throat. My husband and children get out of the car, all safe and unhurt, and I just sit there, unable to move. I notice smoke rising from the car, where the front hood used to be and I think to myself, "Oh no, the car's going to catch fire." I start to panic and Steve comes back to the car to see if I'm all right. I tell him I think I'm OK, but it's hard for me to breathe. He tells me he's going to check on the guy who hit us, to see if he's OK.

I still can't get out of the car. A woman in a white uniform (who I later found out was Sally Bradford from the base hospital) is the first person to arrive on the scene. She comes over and yanks the car door open and helps me out of the car. She leads me over to the other side of the road, away from the car, and treats me for shock.

While I'm lying there, it dawns on me that I could have just been killed if I wasn't wearing my seatbelt. My husband, my children and I could have been thrown through the windshield, but weren't because of our seatbelts. My baby, who turned 2 years old in July, was safely harnessed in his car seat.

I'm so thankful they weren't hurt. More help arrives, including Captain Ribuflo from the hospital's emergency room. Both she and Sally are a great help in comforting me and my family. The ambulance finally arrives and we are taken to the emergency room at the base hospital. Dr. Waters has X-rays done on me and finds I have a fractured sternum (breastbone) but he is worried because it is close to my heart; I might have damaged my heart and may need surgery to repair the fracture. I am sent by ambulance to Marquette General Hospital for possible surgery. It turns out that I don't need surgery now; I'm sent back to the base where I spend the next four nights at the hospital.

I am home now, recuperating from the accident. Dr. Hunter from Marquette says it will take about six weeks for me to feel better and three months before I will be fully healed. I thank my lucky stars I'm alive.

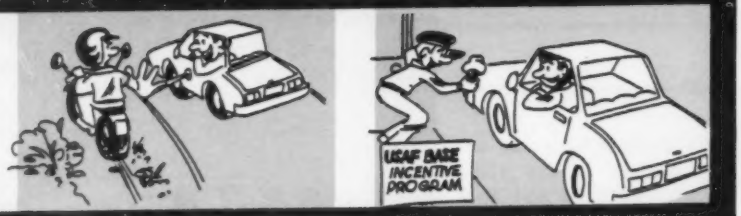
I must confess, we didn't always wear seatbelts. We started wearing them after our third child was born. I had always thought the Air Force went overboard on safety: "Make sure you do this, do that, don't do this, always remember to . . ." For years I would read the safety reminders on the bulletin boards and the safety pamphlets passed around in the office, but I shrugged them off with the "It won't happen to me" attitude.

But this time, being safety-conscious did pay off. I tell you with all sincerity, it doesn't matter what you do. You don't know what the other guy might do to destroy your life and happiness. In this case, he was going 50 to 60 miles per hour around a sharp curve. We were driving in our lane, going 25 mph; he was in our lane because he couldn't make the curve. He hit us head-on, we didn't even have a chance to swerve out of the way. It happened so fast, in a matter of seconds.

Get my point! You can never be sure about that other person on the road. From now on, I will wear my seatbelt every time I'm in a car, even if it's to drive from my office to the BX. Wearing seatbelts saved my life and my family members' lives. I am thankful to be alive to tell you about it. That old saying "Seatbelts do save lives" is true.

Do you wear your seatbelts? If not, put them on every time you get in the car. At first, wearing your seatbelt may be hard or uncomfortable. But soon, fastening your seatbelt will become a habit, one you can't live without. You never know when it will happen to you, do you?

BACKFIRE
LETTERS to the EDITOR



TEACHING A LESSON OR TWO

I am an avid reader of DRIVER. There is not a single issue I have missed since I joined the Navy. I find it very helpful in everyday driving.

I read your article "Emotions at the Wheel" (September 1982) and really enjoyed it. I have something to tell you that does but does not go along with it. Here it is anyway.

It happened about a month ago. I had recently bought a new motorcycle and was on my way back from Norfolk Naval Base headed for Virginia Beach. There was some road work ahead and everyone had to merge into one lane. I was riding along, keeping my eyes open to traffic, when all of a sudden it happened. The car in the lane next to me decided to squeeze into my lane right on top of me. It made me a little mad but I moved over and let him in anyway. But he kept coming on over. Now I was riding on the shoulder. But he kept on coming. I could not stop because of a car behind me, that he had also pushed off the road. I only had one choice — go for the ditch. I managed to do it and slowed down without any problems. By this time I was outraged at him, because the whole time he was looking right at me. The only thing I had on my mind after that was I wished I could find him again sometime and teach him a lesson or two.

Kelly E. Denison
FPO NY, NY 09501

A POSITIVE INCENTIVE PROGRAM

Recent DOD directives mandate the use of car seat belts aboard military installations, but provide no guidance on specific programs to ensure compliance. Although the traditional approach to non-compliance of regulations is the punishment of offenders, one approach worth consideration in this case is a positive incentive program to reward seat belt wearers. This would not only encourage compliance, it might even save lives by rewarding safety.

During normal gate operations at a military base, random cars entering could be stopped and checked. If the passengers are not wearing the seat belts, they can be reminded of the new directive. If the passengers are in compliance, a coupon for a free oil change, lube job, wheel balance or whatever could be issued to reward safety consciousness.

This program could be quickly and cheaply instituted via signs, POD's etc., and the cost of the coupons and service would be negligible compared to the cost of human life.

When safety is involved, a strong emphasis on safety first is one of its proudest traditions and any effort to further this is an excellent investment in our personnel's future.

N.A. Broyles
NAS Jacksonville, FL 32212

ROLL WITH THE PUNCHES

I just saw your August 1982 issue so my comments may not be very timely but I can't ignore the incredible letter from reader Mr. Bob Hammarstrom. I bicycled about 30,000 miles in the Washington, D.C. area from 1976 until my transfer to Puerto Rico in 1981, and I never had or caused an accident. I now ride a great deal all over this beautiful island and practice, as I did in D.C., my defensive "driving" techniques on a daily basis. I will not defend bicyclists who make a nuisance of themselves on the roads; in fact they often get a piece of my mind when we meet on a ride. Nor will I defend drivers for the incredibly stupid and inconsiderate things some of them do; this should not require any elaboration.

The point I want to make is that the highways will be a much better place for all of us if we learn to "roll with the punches" rather than starting out filled with hate for an entire class of highway users. Compare Mr. Hammarstrom's letter with the final letter in that same issue . . . that writer stressed the importance of keeping cool and avoiding anger on the highway, and you commended him for being mature, responsible, and intelligent, and for learning the importance of keeping his emotions under control. I invite Mr. Hammarstrom to cool down some and then try bicycling somewhere instead of driving; he'll not only have fun and get some excellent exercise but he'll also learn what defensive driving is all about!

Cmdr. Denny Freezer, USCG
Aguadilla, PR 00604

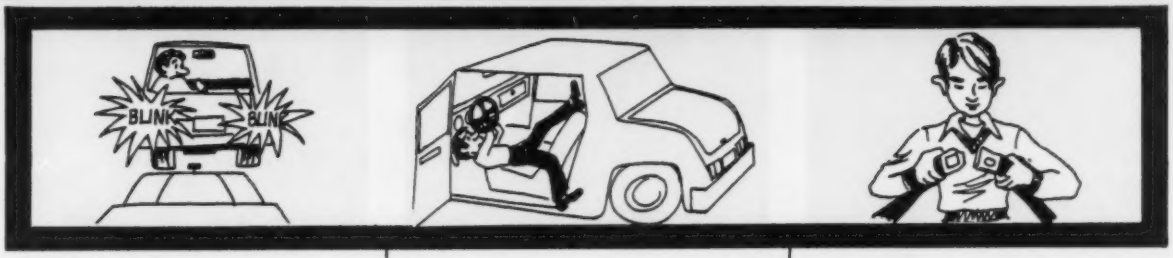
TAILGATER MENTALITY

For eight years I was an Army inspector driving on the public highways over a seven-state area. To discourage tailgaters I was applying the brakes gently to activate the stop light. No one reacted. Teammates insisted my brake lights were not being lit. As a convincer I installed a pilot light on the dash in the circuit, which lit when the brake lights did.

This game became a minor obsession and during all this time *only one* tailgater got the message. I am convinced that stop lights are overrated. At least the tailgater mentality does not respond to them.

Murray Combs
Ft. George Meade, MD 20755

We don't recommend playing games with tailgaters. If they rearend you they get a ticket, but your car is dam-



aged. The best thing is to move over a lane and let them go by to tailgate somebody else.

PARKING BRAKE IS ALWAYS SET

Your "Buying an Awesome Used Four Wheel-Drive" part 1, in the September 82 issue may have left out a safety feature. Page 23 looks like the parking brake is not on. Page 25, 26, and 27 shows the lady under the vehicle. Please correct me if I'm wrong, but shouldn't the parking brake have been set before getting under the vehicle? I'm sure the brake was set before taking the pictures.

SSgt R.F. Ferguson
Clark AB, PI 96274

DRIVER never parks a vehicle without setting the parking brake. The adjustment on the unit pictured was very tight, and while it may look as if it was not set, it was. You're right, even in a case where the vehicle is so high off the ground and could roll away and never touch you under it, the parking brake should always be set.

DOUBLE STANDARD?

Do I detect a double standard or is it in the proofing? You do four pages on seatbelts saving lives and one page on child restraints (Oct. 82) followed by an article on buying a four wheeler with a picture of a sweet young thing with her finger in her ear (I think) and no lap belt. Come on!

An additional comment on the article. You state safety should always come first on any vehicle purchase and mention the "big items" such as tires, brakes, and steering. What about the restraint system? That can tell you a lot about the previous owner and his/her concern for safety. If they're never used, what makes you think the owner would bother to have the brakes checked periodically?

I enjoy the magazine so keep up the good work and screen the photos.

Cdmr. Robert C. Herold, USCG

Very few of us wear seatbelts in parked cars. The cutline reads: Does the engine run on when you turn off the key? You're certainly right about checking the restraint system, not only to tell you something about the former owner but also to be sure the belts are still in shape to do their jobs.

COMPELLED TO WRITE!

I don't often write to magazines in response to editorial comments or letters to the editor; however, I feel compelled to in this instance.

Two of the letters in your October 1982 issue make invalid statements that lead the reader in the wrong direction. In "Cute Decals" the statement on "wear being exponentially proportional to weight" is essentially correct but not complete. In most states, trucks are limited to 65 feet or less and gross 80,000 lbs or less. Eighteen tires with an average ground patch of 37 sq. in. carrying a full load of 80,000 lbs works out to only 102 lbs/sq. in. A fully attired rider and a 10-speed bike weigh around 200 lbs on about 2 sq. in. of ground patch, or 100 lbs/sq. in. Not a lot of wear differential per sq. in.

Additionally, in response to ET2 Allan's idea of roads being constructed for bicycles, I'm sure it would be a tremendous surprise to the builders of the Appian Way and the Great Wall of China, two early examples of limited access roads. In fact, bicycles were developed because roads were available. Roads were then improved to what we know today, due to the requirements of motor vehicles.

Lt. Michael W. McFadden, US Navy
Naval Station, San Diego, CA

The weight per square inch might not be much different, but the "total" wear is still going to be the lbs/sq. in. times the number of square inches: 80,000 lbs is much more than 200 lbs. You've said what we said about roads. Bicycles may have advanced their design rapidly because the roads were available, but they weren't designed because the roads were there. And the design of aircraft advanced very rapidly because of their use as war machines, but they weren't designed to be solely war machines.

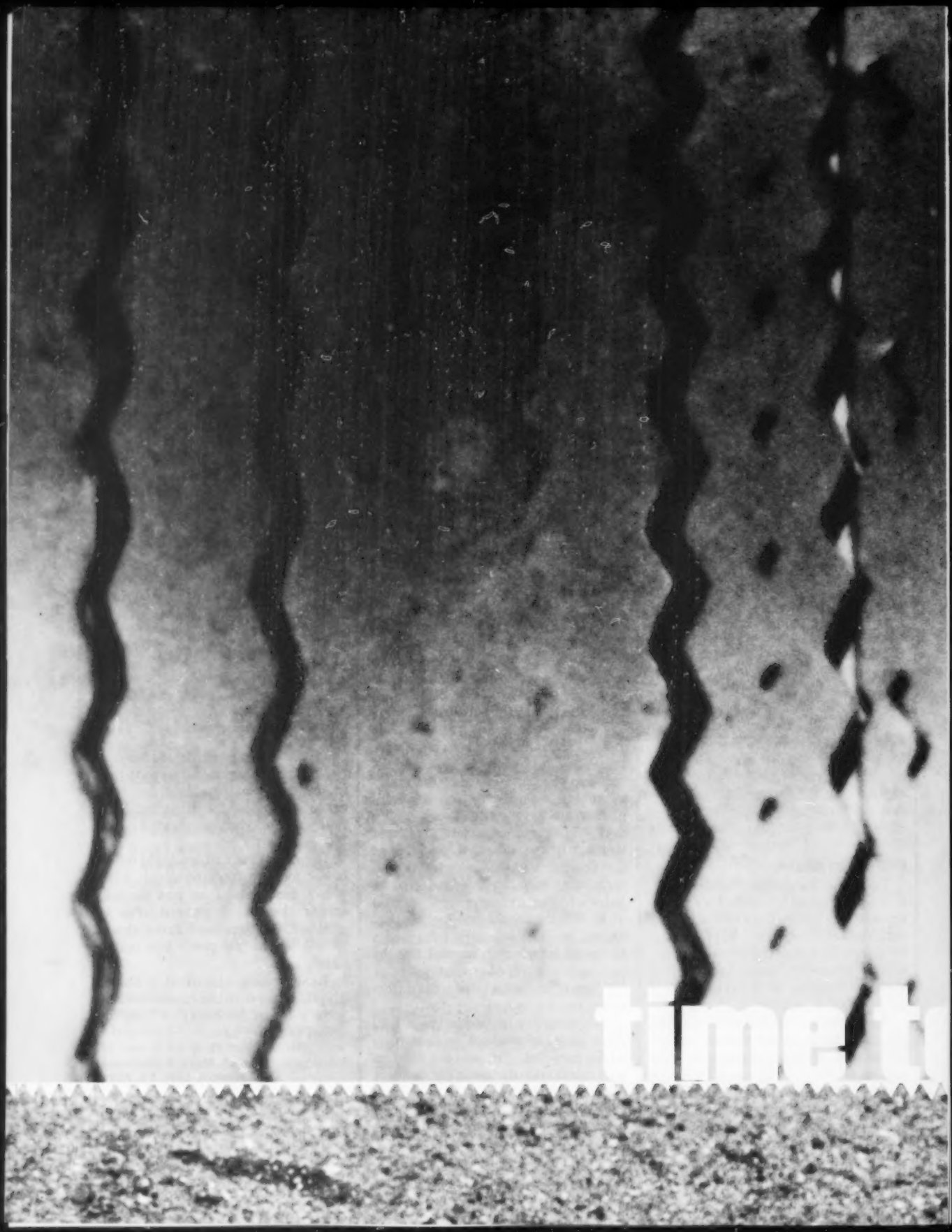
BLOWN FUSE!

On the back cover of your November 1982 issue you listed steps to take in the event of headlight failure. I agree with all of the steps but I feel that you could have expanded on the last one a little more.

The main cause of headlight failure is not loose battery terminals but a blown fuse. The fuse box (usually under the dash) should also be checked. Replacement fuses should be carried in the glove box just in case.

Researching electrical problems should begin with the fuse box. It will save a lot of unnecessary time and effort in many cases.

2nd Lt. Mark S. McCauley
Laughlin AFB, TX 78843

Quick, now! How many of you know where your fuse box is?

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